PB-237 897-T

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Environmental Protection Agency
Research Triangle Park, North Carolina

October 1974

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NTIS
PB 237 897 -T

EPA-TR 49-75

AN ANALYSIS OF AIR POLLUTION IN OSAKA
[Ōsaka in okeru taiki osen jōkyō no ichi-kōsatsu]

by

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Published in Taiki osen kenkyū [Journal of Japan Society of Air Pollution], vol. 5, no. 1, 1970, p. 220.

Measuring networks for air pollution in Osaka are being operated by Osaka prefecture, Osaka city, and Sakai city. The measuring network of Osaka prefecture is connected with some of the measuring points of the cities of Osaka and Sakai, and Osaka prefecture itself has a total of 15 measuring points. The locations of these measuring points are determined from various different reasons, but it is not known if they have the optimal locations from the standpoint of being representative for the area. For this reason, the question of whether the measuring points were representative for the area was studied with

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Translated for Tech. Publications Branch, Information Services Division, EPA, by LEO KANNER ASSOCIATES, P.O. Box 5187, Redwood City, California 94063, (415) 365-3046, October 1974.

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respect to the measuring network of Osaka prefecture. The standard practice in Osaka prefecture at the present time is to measure six items: SO_2, dust, wind velocity, wind direction, temperature, and humidity. Among these items, we made a study at this time concerning SO_2 in particular. The data used in the study were the SO_2 data for the 12-month period from April, 1969 to March, 1970 for which measured values for more than 500 hours a month were available for all the measuring stations. First of all, concerning the monthly mean values, the measuring points in Osaka city may be divided into two groups: a group displaying a high concentration, and a group displaying a medium concentration of pollution. The measuring points outside of Osaka city may be divided into three groups: a group which is influenced by Osaka city and which displays a medium degree of concentration, a group which is believed to be influenced by the Sakai Seaside Industrial Area, and a group displaying an extremely low concentration.

When one calculates the correlation coefficient of the SO_2 concentration between the different measuring points, one can see two groups: a group of measuring points displaying an extremely high correlation as compared with elsewhere, and a group of measuring points which are quite independent and which display a lower correlation than elsewhere. Most of the measuring points belonging to the group with a high correlation are located in the northwestern part of Osaka city, and the measuring points in the group with an extremely low correlation are located in the southern part of Osaka prefecture. Although the values of the correlation coefficients differ from month to month, it

is nevertheless possible to divide the whole into a number of groups.

When component analysis is performed on the basis of the values of the correlation coefficients derived above, it is possible to divide into fairly clearcut groups. Although these results differ from month to month, nevertheless one can still see a tendency for a number of clearcut groups to be distinguished in the whole. That is, the Sakai station and the Hamadera station always occupy extremely close positions in the space composed by the eigen vectors, and these two stations can clearly be considered to be one group. Similarly, the same tendency can also be observed between the Suita station and the Moriguchi station, and between the Setsuyo station and the Yao station. As for the group of measuring points within Osaka city, they display a tendency to be bunched together to a considerable extent with the exception of the Hirao station, which displays distinctive characteristics.

According to the wind rose diagram of the group of measuring points, there are some differences between the Sakai station and the Hamadera station, but the main wind direction is that from the Sakai Seaside Industrial Area. It is indicated extremely clearly that these two stations are influenced even during July, when there is a low concentration.

EIGEN VECTOR OF COMPONENT ANALYSIS

STATION

No.	SUITA	HORIG	YODO	KITA	KONO	CENT	FUSE	HIRA	SETSU	YAO	FUDAI	IZUMI	SAKAI	HAMA	AMAG
1	0.238	0.354	0.258	0.320	-0.014	0.135	0.276	-0.000	0.356	0.295	0.328	0.271	0.269	0.287	0.071
2	0.228	0.240	0.015	0.010	-0.500	-0.514	0.080	-0.461	0.110	0.141	-0.080	-0.120	-0.229	-0.219	-0.061
3	0.305	0.226	-0.162	0.212	0.365	0.187	0.038	0.208	0.039	0.240	-0.244	0.133	-0.421	-0.419	-0.287
4	0.287	0.036	-0.387	-0.278	0.047	0.068	-0.532	0.002	0.216	0.384	0.043	-0.274	0.085	0.190	0.292
5	0.222	0.039	0.340	0.092	0.069	-0.045	0.144	0.199	-0.099	-0.114	-0.212	-0.168	-0.110	-0.182	0.786
6	0.388	-0.132	0.167	-0.519	-0.223	-0.189	0.050	0.463	0.078	-0.028	-0.198	0.366	0.148	0.028	-0.176
7	0.316	0.276	-0.869	0.306	-0.108	-0.032	-0.023	0.232	-0.256	-0.281	-0.184	-0.469	0.401	0.132	-0.286
8	0.229	-0.142	-0.436	0.125	0.207	-0.098	0.214	-0.391	-0.149	-0.076	-0.398	0.391	0.254	0.190	0.175
9	0.314	-0.122	0.531	-0.035	0.072	0.355	-0.319	-0.451	-0.015	-0.217	-0.199	0.021	-0.132	0.184	-0.167
10	0.142	0.179	-0.193	0.134	-0.356	0.161	-0.300	0.061	-0.442	-0.235	0.380	0.433	-0.065	-0.174	0.169
11	0.125	0.125	-0.002	0.031	0.454	-0.556	-0.090	0.073	0.106	-0.410	0.294	0.069	-0.287	0.290	-0.024
12	0.188	-0.290	0.186	0.018	0.131	-0.174	-0.012	-0.017	-0.639	0.543	0.238	-0.098	-0.040	0.132	-0.093
13	0.346	-0.119	-0.238	-0.323	-0.023	0.333	0.577	-0.122	0.003	-0.091	0.363	-0.277	-0.172	-0.012	-0.016
14	0.079	0.068	0.131	-0.203	0.361	-0.114	-0.072	-0.231	0.021	-0.086	0.242	-0.006	0.536	-0.612	-0.031
15	0.233	-0.695	-0.066	0.474	-0.140	-0.080	-0.077	0.101	0.335	-0.108	0.164	-0.042	0.040	-0.193	-0.030